Cleanup to Background – How Do We know What Really is There?

The 2010 Administrative Order on Consent requires cleanup to *local background* or to the *detection limit* if local background is less than reliable analytical equipment capability. Cleanup to low detection limit levels poses unique challenges…

What is the lowest level of an analyte (a select chemical) that can be detected in a sample, and is that level defensible? Three key components to verify this level are the instrument detection limit (IDL), method detection limit (MDL) and method reporting limit (MRL).

IDL - We can see something at this level, but we can't tell how big, or identify what it is.

MDL – The point where we see something with 99% certainty. We know something is present, but we are not sure what it is, and we can only estimate the amount. This is a simple scenario, with the MDL determined in the lab using a pure clean sand spiked with a known analyte.

MDL – Determining MDL for a site soil sample can be more complicated, as other chemicals present in the soil at these low levels can interfere and cause an increase in analytical uncertainty. Values between the MDL and MRL are at best, only estimated values.

MRL – The lowest concentration at which an analyte can be confidently detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

Estimated results (values less than the MRL) are considered when evaluating risk because risk assessment allows a step for addressing elevated analytical uncertainty. However, comparison to Look-Up Table values does not have this step, and sample results used for comparison need to meet strict data quality objectives.

The 2010 AOC defines detection limits for chemicals to be method reporting limits (MRLs).

When making cleanup decisions based on comparison to Look-Up Table values, use of sample results reported at or greater then the MRL will ensure the data generated is defensible, and at a quality that allows us to make decisions regarding where contamination exists with more confidence.